AMENDMENTS TO THE CLAIMS

Please amend the claims as follows.

1. (Original) A method for constructing a frame preamble in an OFDM wireless communication system, comprising:

a) arranging a preamble after a CP (cyclic prefix) located at the head of a frame; and

b) repeatedly arranging a pattern, which has a length shorter than a single OFDM symbol interval, an integer number of times.

2. (Original) The method as claimed in claim 1, wherein the pattern shorter than a single OFDM symbol interval is phase-shifted in the time dimension, and is repeatedly arranged an integer number of times such that adjacent cells have different subcarrier offsets of pilot subcarriers arranged at a specific interval in the frequency dimension.

3. (Currently Amended) The method as claimed in claim 1~~claim 1 or 2~~, wherein, when the length of an effective OFDM symbol interval other than the CP is T_b, the length of the pattern is T_b/N (N is a positive integer) and the preamble is constructed in a manner such that the pattern having the length of T_b/N is repeated K times (K is a positive integer).

4. (Currently Amended) The method as claimed in claim 1~~claim 1 or 2~~, wherein the length of the CP is 0.

5. (Original) A method for acquiring frame synchronization and searching cells based on cross-correlation using a preamble having a length that does not correspond to an integer number of times an OFDM symbol interval, comprising:

a) observing cross-correlation of a received signal and reference patterns and detecting the moment when the absolute value of cross-correlation exceeds a pre- determined threshold to acquire frame synchronization; and

b) observing cross-correlation of the received signal and reference patterns after the frame

synchronization is acquired and detecting the moment when the absolute value of cross-correlation exceeds the pre-determined threshold to carry out cell search.

6. (Original) The method as claimed in claim 5, wherein the a) and b) comprise:

i) measuring the power level of the received signal;

ii) normalizing a result of calculation of the cross-correlation using the measured power level; and

iii) applying the normalized result to the threshold.

7. (Original) The method as claimed in claim 6, wherein, when the normalized result is applied to the threshold, the normalized result is multiplied by a weight and applied.

8. (Original) The method as claimed in claim 5, wherein hard-limiting is applied to the received signal and the cross-correlation is executed.

9. (Original) The method as claimed in claim 6, wherein hard-limiting is applied to the reference patterns and the cross-correlation is executed.

10. (Currently Amended) The method as claimed in claim 5~~claim one of claims 5 through 9~~, wherein noncoherent combining of a predetermined number of times is applied to the absolute value of the cross-correlation and compared to the threshold.

11. (Original) The method as claimed in claim 5, further comprising calculating an average phase difference among the repeated patterns constructing the preamble appearing during a predetermined interval to estimate a carrier frequency based on the frame synchronization acquired at the a) after the b).

12. (Original) The method as claimed in claim 11, further comprising comparing absolute values of results obtained by OFDM-demodulating a preamble signal for which an error of the estimated carrier frequency has been compensated and cross-correlating the preamble signal and

reference patterns in the frequency domain to search for an optimum cell after the carrier frequency is estimated.

13. (Original) The method as claimed in claim 12, wherein, when the preamble is shorter than a single OFDM symbol interval, an interval of the preamble, which has a length corresponding to a positive integer number of times the length of the pattern, is input to a part of an FFT input vector for OFDM demodulation, and the remaining components of the FFT input vector are filled with 0's, and then FFT is carried out.

14. (Original) The method as claimed in claim 12, wherein, when the preamble is longer than a single OFDM symbol interval, an interval having a length corresponding to a positive integer number of times the length of the pattern is selected from the interval of the preamble, which is shorter than a single OFDM symbol interval, other than the interval of the preamble corresponding to an integer number of times a single OFDM symbol interval, the selected interval is input to an FFT input vector for OFDM demodulation, the remaining components of the FFT input vector are filled with 0's, and then FFT is carried out.

15. (Original) A method for acquiring frame synchronization and searching cells based on a cross-correlation using a preamble having a length that does not correspond to an integer number of times an OFDM symbol interval, comprising:

a) observing auto-correlation having a time interval of a basic pattern constructing a preamble for a received signal;

b) normalizing the observed auto-correlation using the power level of the received signal;

c) detecting the moment when the absolute value of the normalized result exceeds a predetermined threshold to acquire frame synchronization; and

d) after the frame synchronization is acquired, observing auto-correlation having the time interval of the basic pattern constructing the preamble for the received signal to carry out cell search.

16. (Original) The method as claimed in claim 15, wherein, when the result of calculation

of auto-correlation is applied to the threshold in the c), the calculation result is multiplied by a weight and applied to the threshold.

17. (Currently Amended) The method as claimed in claim 15 ~~or 16~~, wherein noncoherent combining of a predetermined number of times is applied to the absolute value of the auto-correlation and compared to the threshold.

18. (Original) The method as claimed in claim 15, further comprising calculating an average phase difference among the repeated patterns constructing the preamble appearing during a predetermined interval to estimate a carrier frequency based on the acquired frame synchronization between the c) and d).

19. (Original) The method as claimed in claim 18, further comprising comparing absolute values of results obtained by OFDM-demodulating a preamble signal for which an error of the estimated carrier frequency has been compensated and cross-correlating the preamble signal and basic patterns in the frequency domain to search for an optimum cell after the d).

20. (Currently Amended) The method as claimed in claim 15 ~~one of claims 15,18, and 19~~, wherein hard-limiting is applied to the received signal and the auto-correlation is executed.

21. (Original) The method as claimed in claim 15, wherein the preamble is constructed in a manner such that a specific pattern is repeated having a predetermined phase shift in the time dimension, and adjacent cells have different subcarrier offsets of preamble pilot subcarriers arranged at a specific interval in the frequency dimension.

22. (Original) The method as claimed in claim 19, wherein, when the preamble is shorter than a single OFDM symbol interval, an interval of the preamble, which has a length corresponding to a positive an integer number of times the length of the pattern, is input to a part of an FFT input vector for OFDM demodulation, and the remaining components of the FFT input vector are filled with 0's, and then FFT is carried out.

23. (Original) The method as claimed in claim 19, wherein, when the preamble is longer than a single OFDM symbol interval, an interval having a length corresponding to a positive integer number of times the length of the pattern is selected from the interval of the preamble, which is shorter than a single OFDM symbol interval, other than the interval of the preamble corresponding to an integer number of times a single OFDM symbol interval, the selected interval is input to an FFT input vector for OFDM demodulation, the remaining components of the FFT input vector are filled with 0's, and then FFT is carried out.